28430
S/185/61/006/002/002/020
D210/D304

24.6731

AUTHORS: Bolotin, L.Y., Bomko, V.O., and Revuts'kyy, Ye.I.

TITLE: Smoothing of the accelerating field in a "long" resonator for linearly accelerating heavy particles

PERIODICAL: Ukrayins'kyy fizychnyy zhurnal, v. 6, no. 2, 1961, 163 - 166

TEXT: The author described methods of accurately levelling a field of large electrical length. The levelling was done on a resonator 18 m long loaded with 101 drift tubes and having an electrical length of N = 13.8. This problem had to be studied specially because of the difficulty of aligning fields in resonators containing many drift tubes. For making field measurements the resonator was excited with a highly stable generator. The electric field strength at the axis of the resonator was determined by measuring the magnetic field at its surface, using a magnetic probe. The measurements were carried out on a compensating bridge and were

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accurate to about 0.1 %. The levelling of the field along the accelerating path can be achieved either by varying the drift tube diameter along the resonator, or by tuning discs attached to the drift tubes. Although the latter method reduces the high frequency energy ($\sim$ 20 %) it was adopted because of its convenience for field levelling. The diameter of the tuning discs was chosen at 20 cm. This allowed satisfactory tuning for each segment of the resonator. The first step in the alignment was to determine the frequency characteristics for the drift tubes, 8 cm diameter, and discs, 20 cm diameter. This was done on an experimental resonator with a diameter of 1.5 m and 1 m long, and the results are shown in Fig. 2. Using these curves the resonator field was adjusted at a frequency of 142.5 Mc/s to within ± 10 % of the average. The second step of the alignment was to use the method of harmonic analysis which is based on the expansion of waves $E_{01\ell}$ into Fourier series. Using this method the authors levelled the electric field in the resonator to with in ± 1 %, although the electrical length of the resonator is 1.5 times greater than that of the longest

Smoothing of the accelerating ...

existing resonator at Berkeley. There are 5 figures, and 4 references: 3 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: L.W. Alvarez et al. Ref. of Sc. Instr., 26, N2, 1955, p 111.

ASSOCIATION: Fizyko-tekhnichnyy instytut, AN URSR, m. Kharkiv
(Technical Physics Institute, AS UkrSSR, Khar'kov)

SUBMITTED: July 18, 1960

Card 3/4

BOLOTIN, L.I.; MARKIN, P.S.; MELESHKOV, S.I.

Pulse multicharge ion source with a magnetic beam separation.
Prib. i tekh.eksp. 6 no.6:86-88 N-D '61. (MIRA 14:11)
(Ion sources)

BOLOTIN, L.I.; MARKIN, P.S.; KULYGIN, Yu.F.; SKOROMNYY, G.M.; MELESHKOV, S.I.

Spark multicharge-ion source. Prib. i tekh.eksp. 6 no.6:88-90 N-D '61. (MIRA 14:11)

(Ion sources)

S/089/61/011/001/005/010
B102/B214

29.6731

AUTHORS: Tolok, V. T., Bolotin, L. I., Chechkin, V. V., Nazarov, N. I., Khizhnyak, N. A.

TITLE: A high-current electron accelerator

PERIODICAL: Atomnaya energiya, v. 11, no. 1, 1961, 41 - 45

TEXT: This paper presents a description of the 5-Mev electron linear-accelerator designed, built, and studied in 1955 at the Fiziko—tekhnicheskiy instutut AN USSR (Institute of Physics and Technology AS UkrSSR). The acceleration system consists of two coupled endovibrators excited to standing π waves with $f = 137.4 \cdot 10^{-6}$ cps. The accelerator is fed by 12 autogenerators each of which delivers to the endovibrators up to 100 kw with a pulse duration of 400 μsec. Each resonator is a 16-faced prism, 1100 mm long, the diameter of the inscribed circle of the prisms being 1500 mm. The prisms are made of 1 mm thick copper strips secured to a solid body. The drift tubes (100 mm diameter) form accelerating gaps, each 600 mm long. The h.f. generators work in two cycles with self excitation. The 12 modulators deliver at the anodes of the generator-tubes voltage

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A high-current electron ...

pulses of up to 25 kv. The resonators are kept in a vacuum chamber maintained at a pressure of $(1-2)\cdot10^{-6}$ mm Hg by two diffusion pumps. The electron gun (with tungsten cathode in the form of a flat spiral) is placed inside the drift tube. A special modulator supplies the gun cathode with negative voltage pulses of up to 70 kv and durations of $0.2\cdot10^{-6}$ and $2\cdot10^{-6}$ sec. In normal operation the injection current is 6 a; on pulsed over-heating of the spiral it amounts to 40 a. The construction of the injector provides for the possibility of using an L - cathode. The phase difference of the π vibrations in the resonators is checked by an electron-beam phase meter, and the pulse height by a two-beam oscilloscope. The radial focusing of the beam at the output of the injector is accomplished by the radial component of the h.f. field. The elctron velocity at the output of the first acceleration gap is almost equal to the velocity of light and is not further affected by the radial component of the field. In the first gap there appears also a bunching effect which narrows the phase width of the beam from 2.2 to 1.6 radians, which value remains practically constant in the following gaps. At the exit of the accelerator the beam cross section is ~10 mm with an aureole of about 60 mm. It is focused on

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the target by means of two magnetic lenses; its diameter then becomes 3 mm. To study the possibility of obtaining the maximum current, the particle energy spectra were recorded at the output of the accelerator for different currents. The following results were obtained: A current of 8.5 a with a pulse duration of 0.2 μsec is obtained for an electron energy of 4.5 Mev. A current of 15 a with a pulse duration of 0.2 μsec and an electron energy of 3.8 Mev is yielded from the maximum of the charge that can be accelerated ($3 \cdot 10^{-6}$ coulomb). At this pulse duration a current of up to 25 a may be obtained, but the maximum electron energy is only 3 Mev and the energy spectrum is broader. To reduce this fall of energy and the consequent broadening of the spectrum it is necessary to increase the energy fed to the resonators. A further decrease of the electron energy for obtaining increased current is not convenient because for radial focusing the electron must have relativistic velocity in the first gap. The value of the time average of the current for this accelerator is up to 50 μa for 15 pulses/sec, which must be increased to 100-150 pulses/sec for increasing the average current. The authors thank K. D. Sinel'nikov, P. M. Zeydlits, and Ya. B. Faynberg for discussions. V. I. Veksler and V. V. Vladimirskiy are mentioned.

A high-current electron ...

There are 5 figures and 4 references: 3 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: M. Kelliher, J. Nugard, A. Gale. IRE Trans. Nucl. Sci., No. 3, 1 (1956).

SUBMITTED: July 26, 1960

Legend to Fig.1: 1) generator, 2) resonator, 3) electron gun, 4) connecting opening.

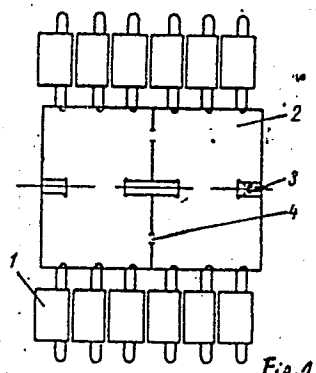

Fig.1

Card 4/4

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S/089/61/011/006/001/014
B102/B138

24.6716

AUTHORS: Berezin, A. K., Faynberg, Ya. B., Berezina, G. P., Bolotin, L. I., Stupak, V. G.

TITLE: Interaction of strong electron beams with plasma

PERIODICAL: Atomnaya energiya, v. 11, no. 6, 1961, 493 - 497

TEXT: The energy losses of a nonmodulated electron beam passing through an air plasma were determined. Beam voltage was 26 kev, amperage 8 a, electron density $(7-9)\cdot10^{10}$cm^{-3}, and pressure in the discharge tube $3\cdot10^{-4}$-$4\cdot10^{-3}$mm Hg. The quartz plasma tube, 64 cm in length, was arranged so that the greater part of the plasma was outisde the focusing magnetic field (2000 oe). The electron gun, a LaB_6 disk 10 mm in diameter, was perpendicular to the magnetic field and was with voltage pulses of up to 30 kev, a width of 3.5 μsec, and repetition frequency of 50 cycles. This gun was able to produce current pulses of 9 a at the plasma chamber input, where the focusing field was 1200 oe. In the field-free region amperage decreased with increasing flight path down to 2 - 3 a due to Coulomb

X

Interaction of strong...

interaction. The plasma density was measured by a cylindrical cavity excited with a TM_{030} wave from a klystron. The upper limit of measurement was $4 \cdot 10^{10} cm^{-3}$. Its value during the passage of current was determined from the plasma decay law: $n = n_o \exp(-t/\tau)$, where τ is the mean time for plasma decay and n_o the density at t=0. The straight line n(t) was drawn from three measurements and extrapolated toward t=0. Maximum electron density was $7 \cdot 10^{10} cm^{-3}$, while the value $9 \cdot 10^{10} cm^{-3}$ resulted from shf-interferometric measurements. The electron energy spectrum was recorded by means of a beam catcher connected to an oscillograph. These spectra were investigated at the input and output of the plasma tube, and for pressures of $4 \cdot 10^{-3}$ and $3 \cdot 10^{-4}$ mm Hg, for which losses reached 11% and 1% of the initial energy, respectively. Conclusions: Energy losses increase with plasma density and with current, and are proportional to the electron mean free path in the plasma. Calculation of losses due to elastic collisions between electrons and gas molecules yields $\simeq 0.04$ ev, and $\simeq 3$ ev for those due to inelastic collisions. Coherent interaction, however, causes losses of 3.2 kev if self-modulation of the beam is assumed to reach

Card 2/3

Interaction of strong...

40%. This is in good agreement with experiments. There are 6 figures and 13 references: 10 Soviet and 3 non-Soviet. The four references to English-language publications read as follows: D. Bohm, E. Gross, Phys. Rev., 75, 1851, 1864 (1949); D. Bohm, E. Gross, Phys. Rev., 79, 992 (1950); V. I. Veksler, Proc. Symp. CERN, 1, 80 (1956); M. Biondi, S. Brown, Phys. Rev., 75, 1700 (1949).

SUBMITTED: June 17, 1961

Care 3/3

X

S/057/61/031/003/005/019
B125/B202

9,2585

AUTHORS: Zagorodnov, O. G., Gaynberg, Ya. B., Yegorov, A. M., and Bolotin, L. I.

TITLE: Multiplication of the frequency by means of plasma "slamming"

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 3, 1961, 297-300

TEXT: The present paper deals with the experimental study of the problem of frequency multiplication by slamming. As is known, a Doppler effect occurs when electromagnetic waves are reflected from a moved surface. In this case frequency and amplitude of the incident wave are changed. The effect concerned can be considerably increased in the case of multiple reflection. This is attained, e.g., by concentrating the electromagnetic energy in a volume completely or partially filled with the plasma. This volume is then rapidly reduced by slamming the plasma. In this case not only density but also the total electromagnetic energy are increased. In the case concerned the energy of the photons that are multiply reflected from the plasma is increased. This effects the reversal of the Fermi

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acceleration effect. In the case of multiple reflection frequency and amplitude strongly increase even in the case $V_\phi \gtrsim C (V \ll C)$. This effect was experimentally checked for an H_{011} wave in the 10-cm region. The electromagnetic field was compressed in a resonator having the shape of a metallic rectangular resonator. The plasma piston entered the resonator by a grating consisting of three metal bands. The second front face of this waveguide gradually passed into a waveguide with the critical wavelength $\lambda_{cr} = 4.6$ cm. This waveguide serves as filter for the harmonic frequencies. The plasma piston was produced by a two-electrode discharge with special ignitor and with additional electrodynamic acceleration. Fig. 1 shows the general block diagram of the experimental arrangement. The beginning of discharge can be regulated such that the plasma compression occurs two to three microseconds after the beginning of the high-frequency pulse in the waveguide. On slamming also the frequency of the electromagnetic field increases as a result of multiple reflection from the moved plasma until the frequency of the field exceeds the critical frequency of the waveguide filter. Fig. 3 illustrates the oscillograms of the high-frequency signals with the "multiplied" frequency at different instants of time of the

Multiplication of the frequency...

plasma slamming. In this case the maximum pulse height of the high-frequency signal with the multiplied frequency corresponds to the shortest duration of slamming. These outputs are separated from the high-frequency pulse which is interrupted by the moving piston by the time interval τ. This time interval corresponds to the "slamming time", i.e., the time required for the multiplication of the frequency of the initial value (in this case 2840 megacycles) to a value slightly exceeding the critical frequency of the waveguide (6530 megacycles). Thus, the frequency was increased by little more than 2.3 times. The spectrum of the oscillations produced by the magnetron contained harmonic oscillations of small amplitudes which penetrate into the waveguide. Their amplitudes reproduce the form of the magnetron pulse. During slamming dissipation of the field energy caused by losses in the cavity and in the plasma compression occurs besides the frequency multiplication and the intensification of the field amplitude. To obtain a sufficiently large amplitude of the signal at the output the "slamming time" must be of the same order of magnitude as the attenuation time $\tau_0 = Q/\omega$. In the experiments described slamming takes ~0.4 microseconds, which corresponds to a

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velocity of motion of $2 \cdot 10^7$ cm/sec of the plasma compression. Thus, it was shown that by slamming a sufficiently strong frequency multiplication can be attained. There are 3 figures and 8 references: 6 Soviet-bloc and 2 non-Soviet-bloc. The 2 references to English language publications read as follows: E. L. Ginston, Science, 127, 3303, 1858; A. C. Kolb, Phys. Rev., 107, 345, 1957.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR Khar'kov (Institute of Physics and Engineering of the AS UkrSSR Khar'kov)

SUBMITTED: May 20, 1960

S/057/61/031/005/009/020
B104/B205

24.2120 (1049, 1163, 1532)

AUTHORS: Zagorodnov, O. G., Faynberg, Ya. B., Ivanov, B. I., Us, V. S., and Bolotin, L. I.

TITLE: Non-linear effects in the propagation of electromagnetic waves in a plasma waveguide

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 5, 1961, 574-576

TEXT: An experimental study has been made of non-linear distortions of sinusoidal electromagnetic waves in a plasma. Non-linearities of this kind occur when the velocity of the plasma electrons interacting with the wave becomes comparable to the phase velocity of the waves. The experiments were conducted with a cylindrical plasma column of 1 cm diameter and 160 cm length, produced by a d-c discharge in mercury vapor within a longitudinal magnetic field. The signals at the input and the output of the discharge tube were conveyed to a double-beam oscilloscope. The dependence of the ratio a_n/a_1 (a_i - amplitude of the i-th harmonic) on the spacing of the two spirals exciting and receiving the electromagnetic

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Non-linear effects...

waves (see Fig. 1) shows that a sinusoidal signal undergoes distortion at a distance of 10 cm and acquires a sawtooth shape. Fig. 2 shows a_2/a_1 as a function of a_1 for different amplitudes of the input signal and different densities of the plasma. It was found further that non-linearities are also produced by a decrease in plasma density, due to the decreasing phase velocity of the waves and the growing amplitude of the signal in the plasma. It is concluded that a sinusoidal signal is distorted by a non-linear plasma. The sawtooth signal observed at the output undergoes further distortion with increasing non-linearity. There are 4 figures and 4 references: 2 Soviet-bloc and 2 non-Soviet-bloc.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR Khar'kov (Institute of Physics and Technology, AS UkrSSR, Khar'kov)

SUBMITTED: July 30, 1960

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23733
S/057/61/031/006/017/019
B116/B201

9,3130

AUTHORS: Berezin, A. K., Stupak, V. G., Bolotin, L. I., Berezina, G.P., Lyapkalo, Yu. M., Sevryukov, Yu. N.

TITLE: Passage of intense pulsed electron beams through dielectric tubes

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 6, 1961, 751 - 753

TEXT: The passage of an electron beam through metal tubes had been studied in theoretical and experimental papers by E. G. Linder and K. J. Herngvist (Ref. 1: Journ. of Appl. Phys., 21, 1088, 1950), by H. F. Ivey (Ref. 2: Advances in Electronics and Electron Physics, 6, 137, 1954), and by M. D. Gabovich (Ref. 3: UFN, 56, 215, 1955). On the passage of a beam through a tube, the residual gas is ionized, and positive ions as well as slow (secondary) electrons appear in the tube. In the case of a metal tube, these secondary electrons reach the wall, and do not participate in the further processes related to the passage of the electron beam through the tube. If the dielectric tube is "overneutralized", the secondary electrons will first reach the wall, and, after a certain time (of the order of magni-

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tude of the time required for complete neutralization of the beam), they will return to the electron-beam axis. Both the radial and the longitudinal component of the electric field are modified by this process. This, however, has an effect upon conditions on the passage of the beam through the tube, particularly upon the energy of secondary electrons. An experimental study has now been made of the passage of a pulsed electron beam through a dielectric tube. The experiment has been conducted in the following manner: A square voltage pulse having an amplitude up to 50 kv, a duration of 4.4μsec (Fig. 1a), and a frequency of 50 pulses/second was applied to the electron gun placed in a vacuum chamber at a pressure of $2 \cdot 10^{-6}$ mm Hg. The gun permitted obtaining an electron beam with an amperage of up to 1 a in the pulse. The electron beam was injected into a quartz tube with an internal diameter of 9 mm and a length of 120 mm. On the other side of the tube, the vacuum chamber was connected with a device, by which the pressure in the chamber was varied from $2 \cdot 10^{-4}$ to 10^{-2} mm Hg. Part of the beam reached the electrostatic analyzer, by which the energy spectrum of the electrons in the beam was determined. A 30-mm wide metal ring, used for measuring the radial

current I_p was mounted on the quartz tube. The signal reaching the ring was differentiated by an RC circuit and fed to the oscilloscope. One of the oscillograms is shown in Fig. 1b. The negative half-wave on the oscillogram corresponds to the motion of secondary ions toward the wall and to the capture of ions near the electron-beam axis. If "overneutralization" takes place in the beam, the electric field will change its sign, and the ions, due to diffusion and other factors, will start moving toward the wall, while the secondary electrons migrate to the beam axis. The positive half-wave on the oscillogram corresponds to this condition. The energy spectrum of electrons passing through the quartz tube, measured with the electrostatic analyzer, permits distinguishing two separate electron groups, i.e., a group of fast electrons and a group of slow electrons. If, under the same conditions, the electron beam is allowed to pass through a metal tube, the spectrum will, as usual, consist of fast electrons only. Experiments have been conducted to determine the moment at which slow electrons of a given energy appear in the beam. The time was calculated from the beginning of the voltage pulse at the electron gun onward. The moment at which slow electrons appear at the analyzer output as a function of their energy is presented in Fig. 1c. As may be seen from Figs. 1b and 1c, slow electrons do not appear in the energy

S/057/61/031/006/017/019
B116/B201

Passage of intense pulsed...

spectrum until the radial field has changed its sign, i.e., not until the electrons start moving from the tube wall toward the beam axis. The results presented in Figs. 1a, 1b, 1c have been obtained under the following conditions: voltage of the beam, 35 kv; beam current, 0.4 a; pressure in the chamber, $3.6 \cdot 10^{-4}$ mm Hg. It is finally pointed out that in the course of experiments described here also the energy spectrum of slow electrons as a function of pressure, intensity, and velocity of the primary electron beam has been has been determined experimentally (no details, however, are given). [Abstracter's note: Essentially complete translation.] There are 2 figures and 3 references: 1 Soviet-bloc and 2 non-Soviet-bloc.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR Khar'kov (Institute of Physics and Technology, AS UkrSSR, Khar'kov)

SUBMITTED: December 30, 1960

31717
S/057/61/031/012/003/013
B108/B138

24.6730

AUTHORS: Bolotin, L. I., Bomko, V. A., Revutskiy, Ye. I., and Sidorenko, I. S.

TITLE: H-mode accelerator

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 12, 1961, 1426-1430

TEXT: The Berkeley type linear accelerators working on the E_{010} mode have several disadvantages. An H_{111}-mode linear accelerator is suggested. A particular feature of such an accelerator is the much lower resonance frequency. 8-cm wide drift tubes are connected to opposite sides of the cylindrical copper resonator (75 cm wide, 120 cm long). The electrical field has a sinusoidal distribution along the resonator. The best way of preventing the maximum of the E_z component in the loaded resonator from moving toward the smaller accelerating gaps is either to change the ratio $\alpha = \frac{\delta}{L}$ (δ = gap length, L = length of accelerating section or to change the inductance of the accelerating units. The increase in the length of the

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H-mode accelerator

accelerating sections from period to period was calculated from the formula $\Delta L_n = \frac{e\bar{E}_{max}\lambda^2}{4mc^2} G_n \cos\varphi_s \sin\frac{\pi z}{h}$ where $\bar{E}_{max}$ denotes the maximum of the time average of electrical field strength, G_n = field consumption factor at the n-th gap, φ_s = synchronous phase. The plant yielded protons with energies of 1.5 - 2 Mev which is in good agreement with the theoretical calculations. The Q factor was 6250. The shunt resistance was 28 megohms, which requires an h.f.-power of some 20 kw for acceleration. The device described can be used for the acceleration of heavy ions (carbon, nitrogen, oxygen, neon, etc.) with low initial energies ($\beta \approx 0.01$). There are 3 figures, 1 table, and 4 references: 1 Soviet and 3 non-Soviet.

SUBMITTED: February 4,1961

Card 2/2

S/185/62/007/002/002/01
D299/D302

24 6731

AUTHORS: Bolotin, I.M., Suprunenko, V.O., Revuts'kyy, Ye.I., and Bomko, V.O.

TITLE: Design and construction of an accelerating system for linear strong-focusing accelerator

PERIODICAL: Ukrayins'kyy fizychnyy zhurnal, v. 7, no. 2, 1962, 132 - 136

TEXT: A semi-empirical method is proposed for designing the accelerating system of a linear accelerator. This problem amounts to studying the distribution of the longitudinal electric field in the gap along the resonator axis and to determining the efficiency factors of the accelerating gaps. These factors are empirically found; they depend on the distribution of the field along the axis. It is assumed that the drift tubes are symmetrical. A comparison of the values of the period I_m, calculated by the approximate and the accurate method, showed that the approximate method is satisfactory. It is assumed that the length of the drift tubes is considerably

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smaller than the wavelength; hence the field can be considered as electrostatic. The problem reduces to the solution of Laplace's equation with given boundary conditions. Thereby one obtains a formula for the efficiency factor:

$$G_n(r) = \frac{I_o\left(\frac{2\pi r}{L_n}\right)}{I_o\left(\frac{2\pi a}{L_n}\right)} \Psi_1(\pi\alpha). \qquad (8)$$

The quantity Ψ_1 depends only on the ratio $\alpha = \delta_n/L_n$, (δ denoting the gap between the drift tubes); it is constant for a given accelerating system; I_o denotes a modified Bessel function. The quantity Ψ is estimated for 2 types of actual boundary conditions: 1) The field at the periphery of the drift tubes is constant, and 2) the field is infinite. It was found that the values of G_n, corresponding to these 2 cases, differed by 6 % only, which is entirely satisfactory for practical purposes. It is noted that the weak dependence of G_n on the boundary conditions, applies only in the case of

moderate values of α. Formula (8) was experimentally verified by the electrolytic-bath method. In conclusion, the obtained formulas can be used in practice. There are 2 figures, 1 table and 3 references: 1 Soviet-bloc and 2 non-Soviet-bloc. The reference to the English-language publication reads as follows: L. Smit and R.L. Clucstern, Rev. of Sc. Instr., 26, 2, 220, 1955.

ASSOCIATION: Fizyko-tekhnichnyy instytut AN URSR (Physicotechnical Institute of the AS UkrRSR), Kharkiv

SUBMITTED: March 21, 1961

Card 3/3

S/120/62/000/002/031/047
E140/E163

AUTHORS: Berezin, A.K., Stupak, V.G., Berezina, G.P., ~~Bolotin, L.I.,~~ Lyapkalo, Yu.M., Solopikhin, D.P., and Bondarenko, V.P.

TITLE: High power electron gun for operation under difficult vacuum conditions

PERIODICAL: Pribory i tekhnika eksperimenta, no.2, 1962, 136-138.

TEXT: An electron gun is described giving 20 A at 25 kV in a vacuum of 5×10^{-5} mm Hg. The cathode is a cylindrical tablet of lanthanum hexaboride, vacuum-sintered, and located in the homogeneous region of the focussing magnetic field. A grid-form anode is used, resulting in a smaller defocusing field than the more usual pierced disc (Fig.1). The transparency of such an anode is also satisfactory. The anode mesh is of tungsten wire 60 μ diameter with a pitch of 1.5 mm. In plasma interaction experiments the gun was used for several months under continuous evacuation without replacement of any of its parts. There are 4 figures.

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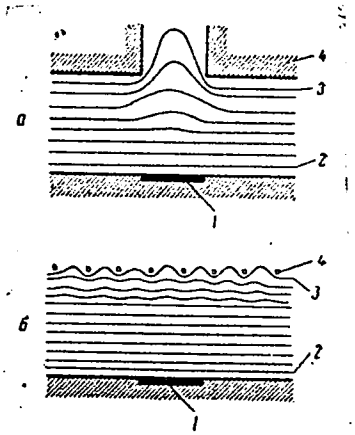
3

High power electron gun for ... S/120/62/000/002/031/047
E140/E163

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR
(Physicotechnical Institute, AS Ukr.SSR)
SUBMITTED: July 26, 1961

Fig.1



Card 2/2

BEREZIN, A.K.; STUPAK, V.G.; BOLOTIN, L.I.; BEREZINA, G.P.

Passage of intensive pulse electron beams through dielectric pipes. Part 1. Zhur.tekh.fiz. 32 no.5:593-599 My 62. (MIRA 15:7)

1. Fiziko-tekhnicheskiy institut AN USSR, Khar'kov.
(Electron beams) (Dielectrics)

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24.6716
24.2120

S/057/62/032/005/014/022
B104/B102

AUTHORS: Berezin, A. K., Stupak, V. G., Bolotin, L. I., and Berezina, G. P.

TITLE: The passage of intense pulsed electron beams through dielectric tubes. II

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 5, 1962, 600-605

TEXT: The energy spectrum of 35 kev electrons in quartz and glass tubes of diameter 9 mm and length 60 mm was oscillographed with the help of an electrostatic analyzer (angle of aperture 2°). A group of slow and another of fast electrons (35 kev) were observed. A study was made of the behavior of these groups in their dependence on the beam energy, the current strength, the pressure of the residual gas, and other factors. The following conclusion is drawn from these observations: When the pressure in the tube is above a critical pressure, ions and slow secondary electrons are generated by the electron beam in the tube. The ions are trapped near the axis and the electrons travel to the wall. At a certain instant reneutralization starts. The electron beam contracts and a radial and

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The passage of intense...

longitudinal "sagging" of the potential occurs. At the same time the secondary electrons return to the axis of the tube. On account of the "sagging" of the potential these electrons are accelerated in the direction of the analyzer and also in the direction of the anode. The energy of the slow electrons is determined by the amount of longitudinal sagging. The energy is proportional to the current strength and the velocity of the electron beam. The longitudinal sagging is perhaps largest at the instant when the current density attains its maximum value, and probably at this same instant the accelerated electrons have their maximum energy. With increasing contraction of secondary electrons at the axis there occurs a new density distribution. The beam of the secondary electrons begins to broaden, and the sagging decreases. The density and the sagging change more rapidly with increasing pressure. K. D. Sinel'nikov and Ya. B. Faynberg are thanked for discussions and advice. There are 9 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR Khar'kov (Physico-technical Institute AS UkrSSR, Khar'kov)

SUBMITTED: June 17, 1961

Card 2/2

ACCESSION NR: AT4036049 S/2781/63/000/003/0125/0138

AUTHORS: Berezin, A. K.; Berezina, G. P.; Bolotin, L. I.; Lyapkalo, Yu. M.; Faynberg, Ya. B.

TITLE: Interaction of pulsed high-current electron beams with a plasma in a magnetic field

SOURCE: Konferentsiya po fizike plazmy* i problemam upravlyayemogo termoyadernogo sinteza. 3d, Kharkov, 1962. Fizika plazmy* i problemy* upravlyayemogo termoyadernogo sinteza (Plasma physics and problems of controlled thermonuclear synthesis); doklady* konferentsii, no. 3. Kiev, Izd-vo AN UkrSSR, 1963, 125-138

TOPIC TAGS: plasma research, plasma magnetic field interaction, plasma wave absorption, plasma wave reflection, electron beam, microwave plasma, plasma electromagnetic property

ABSTRACT: The investigation reported was aimed at determining the energy losses of a beam passing through a plasma, the conditions

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ACCESSION NR: AT4036049

under which oscillations are excited, the frequency spectrum, the amplification coefficients, the character of instability, and comparison of the experimental data with the theory. The electron beam had an approximate energy 15 keV and a current 5--8.5 A. It was injected in a quartz and glass plasma chamber, ionizing the air in it, producing a plasma, and interacting with the latter. After passing through the plasma the beam was electrostatically analyzed. The procedures used to measure the various parameters are described. The experiments have shown that the beam loses an appreciable part of its initial energy (~18%). This energy is consumed in excitation of oscillations and heating the plasma. Some 50--60% of the energy loss goes to excitation of longitudinal space-charge density waves and transverse electromagnetic oscillations; this agrees qualitatively with the theory. It follows from the measurements that the amplification coefficients and the maximum resonant frequency are also in satisfactory agreement with the calculated data. The longitudinal space charge density waves excited in the plasma and in the beam have

ACCESSION NR: AT4036049

phase velocities which are smaller than the velocity of light in vacuum, and have intensities which reach 50--60 kV/m at the end of the interaction region. A small group of the electrons (1--4% of the total current) experiences an increase in energy up to 50%. If the electron beam is initially modulated, its frequency experiences a Doppler shift at the end of the interaction. Orig. art. has: 7 figures and 5 formulas.

ASSOCIATION: None

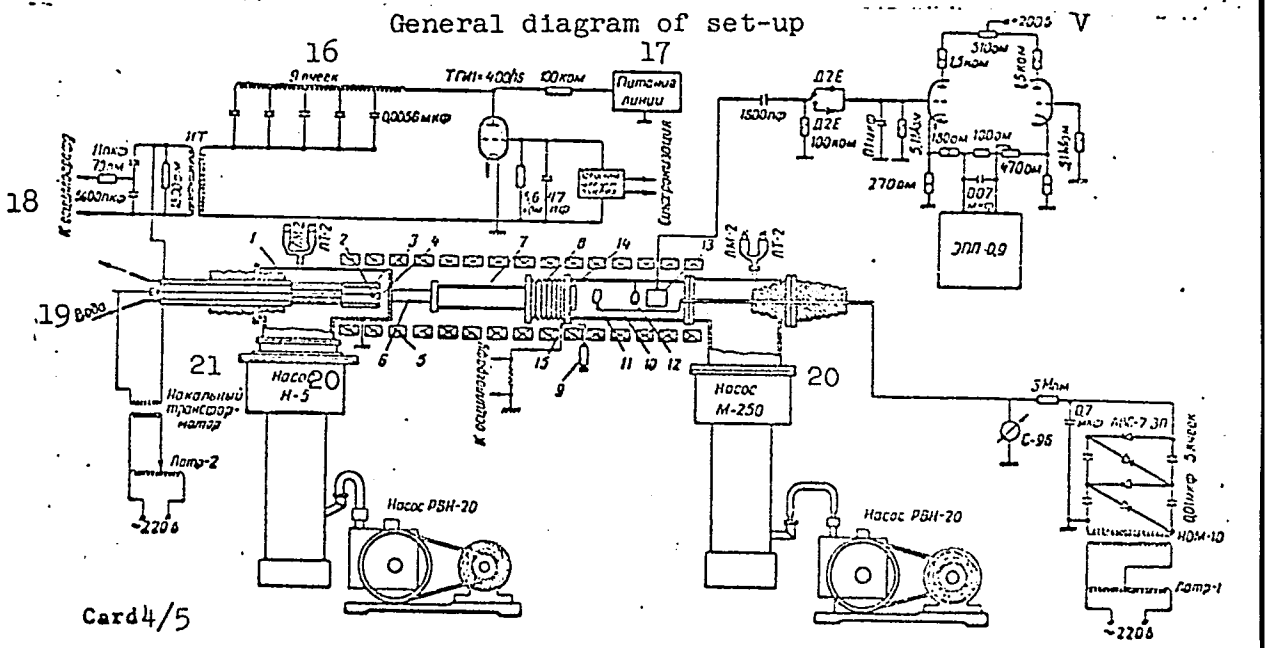
SUBMITTED: 00	DATE ACQ: 21May64	ENCL: 02
SUB CODE: ME	NR REF SOV: 016	OTHER: 005

Card 3/5

ACCESSION NR: AT4036049

ENCLOSURE: 01

General diagram of set-up



Card4/5

ACCESSION NR: AT4036049 ENCLOSURE: 02

Legend to Enclosure 01:

1 - electron gun chamber, 2 - cathode heating, 3 -cathode post, 4 - cathode, 5 - solenoid for focusing longitudinal magnetic field, 6 - tube for producing pressure drop, 7 - plasma chamber, 8 - bellows,9 - mechanical leak valve, 10 - 'retarding field' analyzer, 11 - second analyzer grid, 12 - third analyzer grid, 13 - Faraday cup, 14 - entrance flange for measurement of the beam current, 15 - vacuum window for pumping out the plasma chamber, 16 - nine cells, 17 - line supply, 18 - to oscilloscope, 19 - water, 20 - pump, 21 - filament transformer, MKΦ - microfarad, KOM - kilohm, OM - ohm,

Card 5/5

BEREZIN, A.K.; BEREZINA, G.P.; BOLOTIN, L.I.; FAYNBERG, Ya.B.

Interaction between pulsed heavy-current beams and a plasma in a magnetic field. Atom.energ. 14 no.3:249-256 Mr '63. (MIRA 16:2)

(Electron beams) (Plasma (Ionized gases))
(Magnetic fields)

ACCESSION NR: AP4020575 S/0057/64/034/003/0469/0473

AUTHOR: Zagorodnov, O.G.; Bulotin, L.I.; Bakhtin, V.D.

TITLE: Measurement of high-frequency fields in a plasma waveguide

SOURCE: Zhurnal tekhnicheskoy fiziki, v.34, no.3, 1964, 469-473

TOPIC TAGS: plasma, plasma waveguide, field distribution, field strength, field distribution measurement, field strength measurement, electric probe, electron beam field measurement

ABSTRACT: The longitudinal component of the high frequency electric field in a plasma waveguide was measured. The mercury vapor plasma was contained in a 7-cm diameter glass tube and was excited at 120 Mc by an external electrode at one end. The measurements were performed over a range of plasma densities yielding phase velocities from slightly greater than 0.7c to slightly less than 0.1c. No external magnetic field was applied. The radial distribution of the longitudinal electric field was determined with an electric probe that was movable radially within the plasma. Standing waves were produced by a reflector, and the probe was moved in a plane of maximum electric field. The field amplitude was found to reach a maximum at a radius

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somewhat less than that of the tube. This is presumably due to a decrease in the electron density, and hence in the Langmuir frequency, as the wall of the tube is approached. The measurements were otherwise in good agreement with simple theoretical expectations, and it is concluded that the plasma density within the plasma waveguide can be determined by measurements of the electric field strength distribution outside it. The absolute value of the longitudinal electric field was determined by the deflection of a beam of electrons traversing the waveguide in a direction perpendicular to its axis. The measurements were performed with traveling waves in the waveguide, a suitable load being employed to prevent standing wave formation. Electrons of 10 keV energy were used; these traversed the waveguide in about one-tenth of a wave period. The electron beam deflection was calibrated at low frequency with the aid of a parallel plate capacitor, the distribution of the field between the plates of which approximated that of the field in the waveguide. The results of the measurements were expressed in terms of an equivalent shunt resistance and are presented graphically as a curve showing the equivalent resistance as a function of the phase velocity. [Abstracter's note: The authors state that the equivalent shunt resistance approaches zero as the phase velocity increases, but their curve does not substan-

ACC.NR: AP4020575

tiate this, and it seems doubtful. The authors also state that the equivalent shunt resistance is considerably smaller than the theoretical value at the lower phase velocities, and they account for this as a result of collision frequencies comparable with (although smaller than) the wave frequency.7 "In conclusion, we consider it our pleasant duty to express our gratitude to Ya.B.Faynberg for his interest in the work and for valuable suggestions." Orig.art.has: 7 formulas and 5 figures.

ASSOCIATION: none

SUBMITTED: 02Jul62 DATE ACQ: 31Mar64 ENCL: 00

SUB CODE: PH NR REF SOV: 004 OTHER: 004

Card 3/3

ACCESSION NR: AP4042003 S/0057/64/034/007/1266/1271

AUTHOR: Bomko, V. A.; Revutskiy, Ye. I.; Bolotin, L. I.

TITLE: The high-frequency characteristics of a linear accelerator for multicharged ions of energy up to 1 Mev per nucleon operating on an H_{111}-wave

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 34, no. 7, 1964, 1266-1271

TOPIC TAGS: multicharged ion linear accelerator, linear accelerator

ABSTRACT: A linear accelerator has been designed for multicharged ions accelerating up to 1 Mev per nucleon operating on an H_{111}-wave. The 6-m wavelength was selected. The diameter of the drift tubes was 8 m, which was constant along the whole accelerating system. The maximum voltage in the gap was 72 kv/cm. Experimental investigation of the high-frequency characteristics of the accelerating system showed that proper frequency of the resonator, corresponding to the excitation of H_{111}-oscillations in it, is 50.1 Mcps, almost the same as the calculated value. The Q-factor is 7363, and the shunt resistance is 228.2 Mohm. It is seen that this system, designed for a 6-m wavelength, has a rather high shunt resistance, approximately four times

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ACCESSION NR: AP4042003

higher than that of the E_{010} system on the same wavelength. Thus, the accelerating system on H_{111}-wave appears to be much more effective than the E_{010} for the investigated energy range. The value of high-frequency power needed to establish the calculated value of the accelerating field at the shunt resistance value shown is 80 kw per pulse, in contrast to 400 kw needed in Berkeley, Yale, and England for the same energy at the output. Orig. art. has: 5 figures, 1 table, and 3 formulas.

ASSOCIATION: none

SUBMITTED: 23Aug63 ATD PRESS: 3063 ENCL: 00

SUB CODE: NP NO REF SOV: 002 OTHER: 005

Card 2/2

L 25281-65 EWT(l)/EWG(k)/EPA(sp)-2/EPA(w)-2/EEC(t)/T/EWA(m)-2 Po-4/Pi-4/Pz-6/ Pab-10 IJP(c) AT

ACCESSION NR: AP5003997 S/0089/65/018/001/0005/0014

AUTHOR: Berezin, A. K.; Faynberg, Ya. B.; Bolotin, L. I.; Berezina, G. P.

TITLE: High-frequency oscillations resulting from the interaction of an electron beam with plasma

SOURCE: Atomnaya energiya, v. 18, no. 1, 1965, 5-14

TOPIC TAGS: electron beam oscillation, plasma oscillation, electron plasma interaction, plasma convective instability, plasma longitudinal wave

ABSTRACT: Experiments were performed on the detection and investigation of the oscillations generated in the beam and plasma as a result of their interaction. The experiments were carried out under the condition that the electron Langmuir plasma frequency ω_0 was smaller than the electron cyclotron frequency ω_H. Measurements were made of the frequencies of the waves generated in the beam, their phase velocities, the amplification factors, the intensity of the electric field, the absolute values, and the spectral distribution of the oscillation power. The measurements were conducted for standing and traveling waves at currents of 5 and 8.5 amp in a longitudinal magnetic field of from 720 to 1320 gauss. The frequency of maximum amplified oscillations for 5 amp current was $f_1 \approx 0.53 f_0$, where $f_0 = \omega_0/2\pi$,

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L 25281-65

ACCESSION NR: AP5003997

0

which coincides with calculated data. For a current of 8.5 amp $f_1 \approx 0.44 f_0$. The experimental values for the amplification factors were from 0.21 to 0.26 cm^{-1}, which were close to the calculated 0.32 cm^{-1}. Graphs show that a convective instability develops during the interaction between the electron beam and the plasma. The oscillations generated within the frequency range from 800 to 1100 Mc/sec are longitudinal waves in the beam and plasma brought about by the Cerenkov-Vavilov effect. Orig. art. has: 9 figures and 4 formulas. [JA]

ASSOCIATION: none

SUBMITTED: 04Jun64 ENCL: 00 SUB CODE: NP, ME

NO REF SOV: 008 OTHER: 001 ATD PRESS: 3181

Card 2/2

L 45594-65 EPF(n)-2/EPA(w)-2/EWT(1)/EWG(m) Pi-4/Po-4/Pz-6/Pab-10 IJP(c) DM/KT/GW

ACCESSION NR: AP5009120 S/0089/65/018/003/0271/0273

AUTHOR: Berezin, A. K.; Faynberg, Ya.B.; Bolotin, L.I.; Berezina, G.P.

TITLE: Determination of the total energy lost by an electron beam interacting with the plasma 21 53 B

SOURCE: Atomnaya energiya, v. 18, no. 3, 1965, 271-273

TOPIC TAGS: plasma beam interaction, plasma magnetic field interaction, power loss, calorimeter

ABSTRACT: The work supplements earlier experiments (Atomnaya energiya v. 14, 249, 1963; Fizika plazmy i problemy upravlyaemykh termoyadernykh reaktsiy [Plasma Physics and Problems of Controlled Thermonuclear Reactions], no. III, Kiev, 1963, p. 125) on the determination of the spectra of the longitudinal component of energy of a pulsed electron beam with energy 15 keV interacting with plasma in a longitudinal magnetic field. The earlier experiments analyzed only part of the beam (1--3% of the total current through the plasma), but in the present experiments the total beam was analyzed using a high-sensitivity calorimeter. The equipment is similar to that used in

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L 45594-65

ACCESSION NR: AP5009120

the earlier work. The new calorimeter is described in detail. It was used to measure the average power of the electron beam on entering and leaving the chamber, as a function of the beam current (5 and 8.5 A), the plasma density, and the intensity of the longitudinal magnetic field (400--1320 Oe). The average power of the electron beam determined with the calorimeter was compared with the average power necessary to heat a specified current of water through the calorimeter, and with the average power that can be obtained knowing the current, the beam energy, the pulse duration, and the pulse frequency. The results agreed within 10--15%. Orig. art. has: 1 figure, 2 formulas, 3 tables.

ASSOCIATION: None

SUBMITTED: 04Jun64 ENCL: 00 SUB CODE: NP

NR REF SOV: 003 OTHER: 001

Card 2/2 mb

L 52255-65 EPF(n)-2/EPA(w)-2/EWT(1)/EWG(m) Po-4/Pi-4/Pz-6/Pab-10 IJP(c)
WW/DM/AT

ACCESSION NR: AP5012464 UR/0089/65/018/004/0315/0322

AUTHOR: Berezin, A. K.; Berezina, G. P.; Bolotin, L. I.; Ivanpkalo, Yu. M.; Faynberg, Ya. B.

50
B

TITLE: Interaction of modulated heavy-current pulse electronic beams with a plasma in a longitudinal magnetic field

SOURCE: Atomnaya energiya, v. 18, no. 4, 1965, 315-322

TOPIC TAGS: plasma beam interaction, 21 longitudinal magnetic field, beam modulation

ABSTRACT: The authors report the results of experimental investigations of the interaction of modulated heavy-current pulse electron beams with a plasma situated in a longitudinal magnetic field. The experimental set-up is illustrated in Fig. 1 of the Enclosure. The plasma was produced by the beam itself. Frequency spectra of the oscillations excited by the interaction between the plasma and initially modulated as well as unmodulated electron beams with currents of 5, 3.8, and 2.3 amp were obtained. The results show that under certain conditions the modulated beam interacts with the plasma more strongly than the unmodulated one, and longitudinal waves with considerably larger electric field intensity (by a factor

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L 52255-65

ACCESSION NR: AP5012464

of approximately 7) than the beam without initial modulation are then excited in the beam and in the plasma. The distribution of the longitudinal component of the high-frequency field in the plasma along the system axis was investigated by means of the set-up shown in Fig. 2 of the Enclosure. These distributions made it possible to calculate the spatial growth increments for different values of the beam current and for different powers of initial modulation. For currents 5, 3.8, and 2.3 amp with initial modulation of 600 watts, the increments were found to be 0.13, 0.09, and 0.06 cm^{-1}, respectively. The energy loss due to the initial modulation, amounting to about 7 ±3% of the initial energy of the beam, is in agreement with earlier measurements. Orig. art. has: 7 figures, 4 formulas, and 1 table. [02]

ASSOCIATION: none

SUBMITTED: 01Jul64	ENCL: 02	SUB CODE: ME	
NO REF SOV: 013	OTHER: 001	ATD PRESS: 4008	

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L 49252-65 EWT(m)/EPA(w)-2/EWA(m)-2 Pab-10/Pt-7 IJP(c)

ACCESSION NR: AP5010801 UR/0057/65/035/004/0535/0642

AUTHOR: Lutsenko, Ye.I.; Bolotin,L.I.; Faynberg,Ya.B.; Kharchenko,I.F. 56 55 B

TITLE: Investigation of a linear induction accelerator 19

SOURCE: Zhurnal tekhnicheskoy fiziki, vo. 35, no. 4, 1965, 635-642

TOPIC TAGS: linear accelerator, electron acceleration, plasma, betatron, plasma instability, plasma polarization, plasma heating

ABSTRACT: The authors have investigated the behavior of the "linear plasma betatron" proposed earlier by one of them (Ya.B.Faynberg, Atomnaya energiya, 11, 4, 313, 1962). The apparatus consisted of a 100 cm long 4 cm diameter glass discharge tube surrounded for 60 cm of its length by 12 toroidal iron cores each bearing a single copper turn. Plasma was produced in the discharge tube by high frequency discharges between electrodes at the ends, and a 25 kV 0.6 μfd capacitor was discharged through the copper turns. The "run away" electrons accelerated by the induced electric field were the principal object of study. The mean energy of the "run away" electrons was found to be considerably less than should be expected from the strength of the accelerating field. Plasma polarization and instability effects

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L 49252-65

ACCESSION NR: AP5010801

were sought to account for this reduced electron energy, and both were found. The plasma polarization was detected by observing with an oscilloscope the signal from external electrodes near the ends of the discharge tube, and development of plasma instability was followed by measuring the radiation from the oscillating plasma in the microwave region. Under some conditions accelerated electrons were observed traveling in the backward direction. It is suggested that these may result from a pinch effect, but further experiments will be required for their elucidation. "In conclusion, the authors express their gratitude to N.A.Khizhnyak for discussing the results of the work." Orig. art. has: 2 formulas and 6 figures.

ASSOCIATION: None

SUBMITTED: 26Jun64 ENCL: 00 SUB CODE: NP, ME

NR REF SOV: 004 OTHER: 004

Card 2/2

L 4242-66 EWT(1)/EWT(m)/ETC/EPF(n)-2/EWG(m)/EPA(w)-2/EWA(m)-2 IJP(c)
ACCESSION NR: AT5007973 GS/AT/JXT S/0000/64/000/000/1023/1029

AUTHOR: Berezin, A. K.; Berezina, G. P.; Bolotin, L. I.; Gorbatenko, M. F.; Yegorov, A. M.; Zagorodnov, O. G.; Kornilov, B. A.; Kurilko, V. I.; Lutsenko, Ye. I.; Laypkalo, Yu. M.; Pedenko, N. S.; Kharchenko, I. F.; Shapiro, V. D.; Shevchenko, V. I.; Faynberg, Ya. B.

TITLE: Acceleration of charged particles with the aid of longitudinal waves in plasma and plasma waveguides

SOURCE: International Conference on High Energy Accelerators. Dubna, 1963. Trudy. Moscow, Atomizdat, 1964, 1023-1029

TOPIC TAGS: high energy accelerator, electron beam, plasma accelerator, plasma waveguide

ABSTRACT: Plasma waveguides and noncompensated electron and ion beams can be utilized as accelerating systems in linear accelerators (Faynberg, Ya. B., Symposium CERN 1, 84 1956); *Atomnay energiya* 6, 431 (1959)). In such systems, slow electromagnetic waves $v_\phi \leq c$ are propatated, which are necessary for particle acceleration. The waveguide properties of restrained plasma and noncompensated beams are displayed in the case of waves in the meter and centimeter range even for com-

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ACCESSION NR: AT5007973

paratively small plasma densities around 10^9 to 10^{13} cm^{-3}). Under these conditions the high-frequency energy losses during wave propagation, which are due to the collisions of plasma particles, are small. The density of electrons in metals (about 10^{23}) is many orders greater than is necessary for ensuring waveguide properties in the microwave range. This leads to great losses of high-frequency power during wave propagation in metallic conductors. For plasma densities around 10^9 to 10^{13} cm^{-3}, the energy losses during particle transist through the plasma, which are proportional to plasma density, are insignificant, from 10^{-5} to 10^{-6} ev/cm. This means that plasma waveguides are "transparent" for accelerated particles. According to the conditions of acceleration the particles are divided into individual bunches. Thus the loss of particles moving in the plasma can increase greatly because of the occurrence of coherent deceleration representing the inverse of the effect of coherent acceleration, which was established by V. I. Veksler (Symposium CERN 1, 80 (1956)). However, even for accelerated particle fluxes of the order of tens of amperes, these losses are all insignificant. Because waveguide properties are determined by the plasma, the metal surfaces can be remote from regions with large field strengths or eliminated altogether, which permits a significant increase in the permissible voltages of the accelerating fields and a substantial de-

crease in the high-frequency energy losses. It is also important to concentrate the electromagnetic energy in the radial direction only in the regions where the accelerated particles are moving. Thus for a given field strength the electromagnetic energy flux decreases markedly. If the fluxes of accelerated particles are large, the waveguide properties necessary for acceleration can be ensured by the particles of the beam which are not entrapped in the acceleration process, through which particles the entrapped particles move. The beam itself which is injected into the accelerator operates under these conditions of an accelerating system. To clarify the possibilities of particle acceleration by means of electromagnetic waves excited by charged particle beams, and also to investigate the influence of beam instabilities upon the acceleration process, the Physicotechnical Institute, Academy of Sciences Ukrainian SSR conducted theoretical and experimental investigations on the interaction of charged particle beams with a plasma. These investigations were intended to lead to, not the design and construction of a definite accelerator model, but the physical processes occurring during the interaction under consideration, and in this way to a determination of the possibilities of plasma methods of acceleration which are being developed at this institute. The theory developed up to the present time of the interaction between beams and plasma has been essentially a linear theory. As a result of the work of V. D. Shapiro and V.

L 4242-66

ACCESSION NR: AT5007973

I. Shevchenko at this institute for the case of beams of not very large density, a nonlinear theory has been created which permits one to trace the process of interaction of an initially nonmodulated beam and mono-energetic beam with a plasma from the initial stage to saturation. As is shown, a large part of the beam's energy of ordered motion (75% of its initial energy) is lost by the beam as a result of collective interactions with the plasma. Thus the energy expended upon excitation of oscillations amounts to 30%; upon increasing the thermal energy of the plasma, to 30%; and upon increasing the thermal energy of beam, to 15%. The experimental investigations of this interaction were carried out by I. F. Kharchenko and A. K. Berezin and their respective co-workers. Their results are in agreement with the theory of M. F. Gorbatenko. The mentioned institute has also carried out further theoretical and experimental investigations on the problems of electromagnetic wave propagation in plasma waveguides excited by high-frequency wall sources. The experimental studies, by O. G. Zagorodnov, et al., showed that the results agree well with theory under conditions of insignificant nonlinear effects. Current experiments are concerned with highly-ionized plasmas with density 10^{11} to 10^{12}. Orig. art. has: 4 figures, 1 table.

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L 4242-66

ACCESSION NR: AT5007973

3

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR (Physicotechnical Institute, AN UkrSSR)

SUBMITTED: 26May64 ENCL: 00 SUB CODE: NP

NO REF SOV: 005 OTHER: 001

BVK

Card 5/5

L 2489-66 EWT(1)/ETC/EPF(n)-2/EWG(m)/EPA(w)-2 IJP(c) AT
ACCESSION NR: AP5020721 UR/0057/65/035/008/1378/1384

44,55 44,55 44,55 70 B

AUTHOR: Kornilov, Ye. A.; Kovpik, O. F.; Faynberg, Ya. B.; Bolotin, L. I.; Kharchenko, I. F. 44,55 44,55

TITLE: Time variations of high frequency oscillations during development of instability in a beam-plasma system 21,44,55

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 35, no. 8, 1965, 1378-1384

TOPIC TAGS: plasma instability, plasma beam interaction, plasma oscillation, electron beam, magnetic field

ABSTRACT: The authors have continued their investigations, described in the preceding paper (ZhTF, 35, 1372, 1965; see abstract AP 5020720), of the production of plasma by an electron beam traversing a gas in a longitudinal magnetic field. The authors describe their apparatus in the preceding paper and in more detail elsewhere (Fizika plasmy i problemy upravlyayemogo termoyadernogo sinteza, Vol.4. Izd. AN USSR, Kiyev, 1964). It was found that oscillations are excited at integral multiples of half the Larmor frequency and that the width and peak frequency of the spectrum of these oscillations vary periodically at the frequency of ionic sound.

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L 2489-66
ACCESSION NR: AP5020721

The spectrum narrows with increasing pressure and broadens with increasing beam current. When the magnetic field strength is increased beyond a certain value, the oscillations cease to be continuous but come in bursts which follow each other at intervals that decrease with increasing magnetic field strength. Tilting the beam moderately with respect to the direction of the magnetic field so as to introduce a small transverse velocity component increased the amplitude of the oscillations by two orders of magnitude. The reasons for the pulsation of the oscillations at high field strengths, for the increase of the amplitude of the oscillations in the presence of a transverse electron velocity component, and for the periodic variation of the spectrum of the oscillations are still obscure. Orig. art. has: 7 figures.

ASSOCIATION: none

SUBMITTED: 26Oct64 ENCL: 00 SUB CODE: ME

NR REF SOV: 012 OTHER: 007

Card 2/2

L 24119-66 EWT(1)
ACC NR: AP6014609

SOURCE CODE: UR/0386/66/003/009/0354/0357

AUTHOR: Kornilov, Ye. A.; Faynberg, Ya. B.; Bolotin, L. I.; Kovpik, O. F.

ORG: Physicotechnical Institute, Academy of Sciences, Ukrainian SSR (Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR)

TITLE: Suppression of low-frequency oscillations in two-stream instability by prior modulation of the electron beam

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 3, no. 9, 1966, 354-357

TOPIC TAGS: plasma instability, plasma oscillation, plasma beam interaction, electron beam, beam modulation

ABSTRACT: This is a continuation of earlier work (coll. Vzaimodeystviye puchkov zaryazhennykh chastits s plazmoy [Interaction of Charged Particle Beams with a Plasma], p. 18, Kiev, 1965), where it was shown that development of a two-stream instability is accompanied, besides high-frequency oscillations (1000--6000 Mcs), also by low-frequency oscillations (10 kcs--30 Mcs) and by intense ion currents. To check on the cause of these low-frequency oscillations and to find methods of suppressing these oscillations, the authors experimented with an electron beam (up

Card 1/2

L 24119-66
ACC NR: AP6014609

to 100 ma) of 2--5 kev particles injected into an interaction chamber situated in a longitudinal magnetic field of intensity up to 2000 oe. The experimental setup was similar to that described earlier. The results show that the low-frequency oscillations are caused by the high-frequency ones and can be suppressed by modulating the beam at a modulating frequency equal to twice the electron gyro frequency. The prior modulation of the beam suppresses also the high-frequency oscillations. The suppression efficacy increases with increasing depth of modulation. Orig. art. has: 2 figures.

SUB CODE: 20/ SUBM DATE: 28Feb66/ ORIG REF: 005

Card 2/2

EPF(n)-2/EWT(1)/ETC(f)/EWG(m) IJP(c) AT/GS

ACC NR: AT6008861 SOURCE CODE: UR/0000/65/000/000/0207/0221

AUTHOR: Lifshits, Ye. V.; Berezin, A. K.; Bolotin, L. I.; Lyapkalo, Yu. M. 73 B+1

ORG: none

TITLE: Spectroscopic investigation of the interaction between beams of charged particles and a plasma

SOURCE: AN UkrSSR. Magnitnyye lovushki (Magnetic traps). Kiev, Naukova dumka, 1965, 207-221

TOPIC TAGS: electron temperature, ion temperature, plasma physics, charged particle, electron beam, spectroscopy

ABSTRACT: The authors consider the possibilities for spectroscopic analysis of the fundamental processes which take place during interaction of charged particles with a plasma and determine the basic parameters and relationships which are characteristic for this interaction. The electron temperature, ion temperature and rf field strength are determined. The measurements were made for instantaneous and time-averaged values. An electron beam (with a current of 12 a and an energy of 20 kv) was passed through a discharge tube in which the pressure was varied from $8 \cdot 10^{-4}$ to 10^{-2} mm Hg. The current pulse duration was 4.5 μsec with a prf of 50 cps. The beam was 20 mm in diameter. The density of the plasma formed during passage of the beam through the shock tube

Card 1/2

ACC NR: AT6008861

reached a value of $6 \cdot 10^{11}$ cm^{-3}. The plasma and beam were located in a constant magnetic field with an intensity of 1200 oersteds. The shock tube was filled successively with argon, helium, hydrogen, air and mixtures of gases. A detailed description is given of the experimental procedure and analytical formulas used in measuring the electron and ion temperatures. Orig. art. has: 9 figures, 4 tables, 8 formulas.

SUB CODE: 20/ SUBM DATE: 20Oct65/ ORIG REF: 009/ OTH REF: 006

Card 2/2 PB

L 04747-67 EWT(1) IJP(c) AT/GD

ACC NR: AT6020454 (N) SOURCE CODE: UR/0000/65/000/000/0229/0234

AUTHOR: Pedenko, N. S.; Bolotin, L. I.; Faynberg, Ya. B.; Kharchenko, I. F.; Shepelev, N. P.

ORG: none

TITLE: High current linear induction accelerator

SOURCE: AN UkrSSR. Vzaimodeystviye puchkov zaryazhennykh chastits s plazmoy (Interaction of charged particle beams with plasma). Kiev, Naukova dumka, 1965, 229-234

TOPIC TAGS: plasma accelerator, plasma heating, betatron accelerator, Mev accelerator

ABSTRACT: A method of generating powerful electron beams and the use of these beams to generate large amplitude electrostatic waves and to heat a plasma are described. The linear betatron constructed for this study consists of an electron source and an accelerating section formed by a power transformer with unity transformation coefficient. The outline of the design is given in a block diagram and its operation is discussed. An electric field of 6 kv/cm was achieved in the accelerating section. The total potential of 200 kv resulted in electron beam currents of 1000 A. The analysis of the design has shown that the most suitable source of energy is a series of capacitors with spark-gap switching. This scheme eliminates synchronization problems and provides a desirable current pulse. The design reported here can basically serve as

Card 1/2

L 04747-67
ACC NR: AT6020454

a guide in the construction of a high current accelerator operating in the megavolt range. Orig. art. has: 2 figures, 1 table, 3 formulas.

SUB CODE: 18 SUBM DATE: 11Nov65/ ORIG REF: 005/ OTH REF: 002

Card 2/2

L 04438-67 EWT(1)

ACC NR: AP6015343 SOURCE CODE: UR/0119/66/000/005/0022/0024

AUTHOR: Bol'shakov, M. G. (Engineer)

ORG: none

25
B

TITLE: PMP multiposition stack switches

SOURCE: Priborostroyeniye, no. 5, 1966, 22-24

TOPIC TAGS: electric switch, stack design switch / PMP switch

ABSTRACT: Developed by the author (Certificates nos. 132294, 138655, 158322, "Bull. izobr.", 1960, no. 19; 1961, no. 11; 1963, no. 21) and intended for controlling small motors, transformers, etc., the PMP multiposition switches operate at 380 v and interrupt currents up to 10 amp. Up to six plastic-material wafers carrying contact blades are stacked and can be turned through 30, 45, 60, or 90°. Both circuit breaking and nonbreaking change-over mechanisms are used. The switches are claimed to be shockproof and able to operate within −60+85C. Structural details are shown, and examples of application given. Orig. art. has: 7 figures.

SUB CODE: 09 / SUBM DATE: none

awm

Card 1/1

UDC: 621.316.543.2:621.316.544.3

EWI(1) IJP(c) AT/GD

ACC NR: AT6020453 (N) SOURCE CODE: UR/0000/65/000/000/0217/0228

AUTHOR: Lutsenko, Ye. I.; Bolotin, L. I.; Faynberg, Ya. B.; Kharchenko, I. F.

ORG: none

53

B+1

TITLE: Investigation of a linear induction accelerator

SOURCE: AN UkrSSR. Vzaimodeystviye puchkov zaryazhennykh chastits s plazmoy (Interaction of charged particle beams with plasma). Kiev, Naukova dumka, 1965, 217-228

TOPIC TAGS: plasma accelerator, plasma pinch, electron polarization, plasma density

ABSTRACT: The aim of the experiments described in the present work was to investigate instability in electron beams generated in a plasma by the application of electric fields greater than those given by the criteria for the "run-away" condition. The accelerating system consists of 12 toroidal cores with one-turn coils. These coils serve as the primary circuit of the accelerating system and are energized by a capacitor discharge. The secondary circuit, formed by a plasma column 4 cm in diameter, was thus subjected to a spiral electric field. The plasma, initially generated by a 0.5 kw HF generator, reached a density of 10^{10} cm^{-3}. The polarization effects, generated current of accelerated particles and the spectrum of the induced oscillations were studied using Rogovskiy coils and microwave equipment. Typical currents of 30 amp with electron energy of 25-30 kev were generated. This is considerably below the available

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L 04748-67
ACC NR: AT6020453

stored energy and is explained by the observed oscillations radiated by the plasma and correlated with the current pulse. Electron beams moving in the opposite direction to the applied field were also observed. These were correlated with the radial pinching of the plasma. Orig. art. has: 7 figures.

SUB CODE: 20/ SUBM DATE: 11Nov65/ ORIG REF: 003/ OTH REF: 006

Card 2/2

BOLOTIN, Leonid Markovich, delegat I z'izdu Kommunistichesksoy Spilki Molodi Ukraini

Lead us, our party! Znan.ta pratsia no.6:2-4 Je '59.
(MIRA 12:11)

(Ukraine--Revolution, 1917-1921)
(Communist Youth League)

BOLOTIN, N. I.

BOLOTIN, N. I. -- "Aspects of the Symmetry of Certain Structures in Greece in the Fifth Century B. C." Min Higher Education USSR. Leningrad Order of Labor Red Banner Construction Engineering Inst. Leningrad, 1955. (Dissertation for the Degree of Candidate of Architectural Sciences.)

SO: Knizhnaya Letopis', No 5, Moscow, Feb 1956

VENERAKI, I.E.; BOLOTIN, N.K.

Experimental determination of heat in the steam generation of diethylene glycol. Gaz. prom. 9 no.3:30-32 '64.
(MIRA 17:9)

BOLOTIN, N.N., elektromonter.

Repairing electric motors for pumps type PA-22. Energetik 1 no.4:27 S '53.
(MLRA 6:8)
(Electric motors)

ACC NR: AP6022409 (N) SOURCE CODE: UR/0317/66/000/002/0054/0056

AUTHOR: Bolotin, S. (Engineer; Lieutenant commander); Veselkov, A.

ORG: None

TITLE: Repair by the crew's hands

12
13

SOURCE: Tekhnika i vooruzheniye, no. 2, 1966, 54-56

TOPIC TAGS: marine engineering, marine equipment, ~~naval force organization~~

ABSTRACT: The activities taken by the crew of a ship with respect to the repair and maintenance of engineering equipment during a long navigation in open sea are described and highly praised. The vessel in question was under the command of Lieutenant Commander P. Shmyrev. A high care of engines and compressors to keep them in operating condition was continuously applied by the crew. A mixture of epoxy resin with cast iron chips was successfully used for stopping up holes in corroded surfaces of water pumps. The experience of skilled crew members for determining, from outside, the causes of malfunctioning mechanisms was widely used on the vessel in order to avoid as much as possible the unnecessary dismantling of equipment. Only prescribed and well purified oils and greases were used for lubrication. Boilers and engines were regularly cleaned and anticorrosive agents were applied. The crew was well trained for execution of repairs and reworking of constituent parts and materials. Members of the crew were encouraged to enroll in corresponding schools for studies of engineering subjects.

SUB CODE: 13/ SUBM DATE: None

Card 1/1 UDC

BOLOTIN, S.A., inzh. kapitan-leytenant

Prolonging the time between repairs of a minesweeper. Mor. sbor. 48 no.10:62-64 O '65. (MIRA 18:9)

VYDRIN, Andrey Ivanovich; GAMUS, Moisey Zalmanovich; BOLOTIN, V.D., inzh., retsenzent; REZNITSKIY, L.M., kand. tekhn. nauk, red.; BORODULINA, I.A., red. izd-va; BARDINA, A.A., tekhn. red.

[Partial mekhanization and automation in assembly shops] Malaia mekhanizatsiia i avtomatizatsiia v sborochnom tsekhe. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1961. 164 p. (MIRA 14:8)

(Machine-shop practice) (Automation)

VYDRIN, A.I.; GAMUS, M.Z.; PAKHOMOV, A.Ye.; BOLOTIN, V.D., inzh., retsenzent

[Mechanization of labor-consuming operations in the manufacture of steam turbines] Mekhanizatsiia trudoemkikh rabot v paroturbostroenii. Moskva, Mashinostroenie, 1964. 231 p. (MIRA 17:9)

83757

S/056/60/039/003/002/045
B004/B060

26.1410

AUTHORS: Akhmatov, A. P., Blinov, P. I., Bolotin, V. F., Borodin, A. V., Gavrin, P. P., Zavoyskiy, Ye. K., Kovan, I. A., Oganov, M. N., Patrushev, B. I., Piskarev, Ye. V., Rusanov, V. D., Smolkin, G. Ye., Striganov, A. R., Frank-Kamenetskiy, D. A., Cheremnykh, P. A., Chikin, M. V.

TITLE: Magnetoacoustic Resonance in the Plasma

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 3 (9), pp. 536-544

TEXT: The authors wanted to study the penetration of oscillations into the plasma taking place transversally to a static magnetic field. From the physical point of view, this process has a course similar to acoustic oscillations, with the difference that the magnetic pressure $H^2/8\pi$, and not the gas pressure, is effective here. (1) is written down as a resonance condition: $\alpha H_0/\omega R\sqrt{4\pi\rho} = 1$, where α is a dimensionless number characterizing the type of oscillations, H_0 the strength of the

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static magnetic field, ρ the density of the plasma, ω the cyclic frequency, and R the radius of the plasma cylinder. The following is written down for the radial amplitude of the plasma motion velocity: $v_r \approx \tilde{H} u_{ph}/H_0 \approx \tilde{H}/\sqrt{4\pi\rho}$ (H = strength of the magnetic alternating field, u_{ph} = phase velocity of the magnetic field). The interaction of an electromagnetic high-frequency field $\tilde{H}$ with a cold plasma was experimentally investigated in a cylinder in the presence of an axial quasistatic magnetic field H_0. Fig. 1 shows the scheme of the apparatus used for the experiments. In one such experimental series the alternating field had a frequency of 12.5 Mc/sec, while in another series the frequency was 50 Mc/sec. The plasma glow was recorded by means of an ФЭУ-19 (FEU-19) photomultiplier and an ОК-17М (OK-17M) oscilloscope, while the penetration of high-frequency oscillations into the plasma and the radial amplitude distribution of the magnetic alternating field were studied with the aid of a magnetic probe. The experiments were conducted with hydrogen, helium, argon, and air at an initial pressure of

10^{-4} - 6.10^{-3} torr. The oscillograms of Figs. 2,3 show that resonance phenomena appear in the range between 300 oersteds and 5 kilooersteds. Fig. 4 shows the effect of resonance on the spectral lines of hydrogen. There is a dependence of the amplitude H_r of the magnetic resonance field on the amplitude of the $\tilde{H}$-field. Fig. 5 shows the spatial distribution of the amplitude H_r of the resonance field in hydrogen and argon. As may be seen from Fig. 6, the resonance shows a fine structure. This effect is being further investigated. A gas temperature of 2.5 ev was calculated from the Doppler broadening of the H_β line (Figs. 7,8) corresponding to 0.8 A. Experimental data for H_r confirmed the validity of equation (1). Experiments with argon at frequencies above the hybrid frequency yielded no appreciable difference as compared with the effect observed with frequencies below the hybrid frequency. The authors assume that the appearing oscillations propagated obliquely, not perpendicularly to H_0. This was confirmed by measurement of the azimuthal component of the magnetic field H_φ (Fig. 9). The authors thank I. V. Kurchatov, Academician, for interest displayed in the work. There are 9 figures and 4 references: 2 Soviet, 1 US, and 1 German.

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Magnetoacoustic Resonance in the Plasma

S/056/60/039/003/002/045
B004/B060

SUBMITTED: April 2, 1960

Card 4/4

BOLOTIN, V.F.; ZAVOYSKIY, Ye.K.; OGANOV, M.N.; SMOLKIN, G.Ye.; STRIGANOV, A.R.

[Use of electron-optical light amplifiers for spectroscopic studies of a weakly radiating plasma] O primenenii elektronno-opticheskikh usilitelei sveta dlia spektroskopicheskikh issledovanii slabosvetiashcheisia plazmy. Moskva, In-t atomnoi energii, 1960. 11 p. (MIRA 17:2)

AKHMATOV, A.P.; BLINOV, P.I.; BOLOTIN, V.F.; BORODIN, A.V.; GAVRIN, P.P.; ZAVOYSKIY, Ye.K.; KOVAN, I.A.; OGANOV, M.N.; PATRUSHEV, B.I.; PISKAREV, Ye.V.; RUSANOV, V.D.; SMOLKIN, G.Ye.; STRIGANOV, A.R.; FRANK-KAMENETSKIY, D.A.; CHEREMNYKH, P.A.; CHIKIN, R.V.

[Magnetoacoustic resonance in a plasma] Magnito-zvukovoi rezonans v plazme. Moskva, In-t atomnoi energii, 1960. 23 p. (MIRA 17:2)

L 17870-63 EWT(1)/EWG(k)/BDS/EEC(b)-2/ES(w)-2 AFFTC/ASD/ESD-3/AFWL/ IJP(C)/SSD Pz-4/Pi-4/Po-4/Pab-4 AT

ACCESSION NR: AP3003708 S/0048/63/027/007/0986/0990

AUTHOR: Bolotin,V.F.; Zavoyskiy,Ye.K.; Oganov,M.N.; Smolkin,G.Ye.; Striganov,A.R.

TITLE: Use of image intensifier tubes for spectrometric investigation of weakly luminous plasmas /Report of the Fourteenth Conference on Atomic and Molecular Spectroscopy held in Gor'kiy from 5 to 12 July 1961/

SOURCE: AN SSSR, Izv.Seriya fizicheskaya, v.27, no.7, 1963, 986-990

TOPIC TAGS: image intensifier , plasma spectroscopy, photographic spectroscopy

ABSTRACT: The present paper is a general discussion, based on the literature and some preliminary and tentative experiments, of the feasibility of using electron-optical image intensifiers for spectroscopic purposes. The results of the authors' preliminary experiments, involving pulse discharges in hydrogen and other gases, show that lines too weak to be recorded by the conventional photographic procedure can be detected with the aid of an image intensifier. Comparison with line widths determined in other ways indicates that the image intensifier technique does not introduce significant line broadening. It is noted that use of high amplification factors involves special problems as regards processing of the photographic nega-

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ACCESSION NR: AP3003708

tives and subsequent microphotometry. /Abstracter's note: A block diagram of the set-up is given, but the paper does not describe the intensifier tube or give any quantitative details./ Orig.art.has: 3 figures.

ASSOCIATION: Institut atomnoy energii im I.V.Kurchatova Akademii nauk SSSR (Institute of Atomic Energy, Academy of Sciences, SSSR)

SUBMITTED: 00	DATE ACQ: 02Aug63	ENCL: 00
SUB CODE: SD, PH	NO REF SOV: 009	OTHER: 000

Card 2/2

ACC NR: AT6001404 SOURCE CODE: UR/3180/64/009/000/0175/0183

AUTHOR: Bolotin, V. F.; Demidov, B. A.; Zavoyskiy, Ye. K.; Skachkova, Yu. F.; Smolkin, G. Ye.; Panchenko, S. D.

ORG: none

TITLE: Further development of the electrooptical chronographic method and its application to physical plasma investigations

SOURCE: AN SSSR. Komissiya po nauchnoy fotografii i kinematografii. Uspekhi nauchnoy fotografii, v. 9, 1964. Vysokoskorostnaya fotografiya i kinematografiya (High-speed photography and cinematography), 175-183 and insert facing page 169

TOPIC TAGS: time measurement, electric discharge, electrooptic image intensifier, plasma diagnostics

ABSTRACT: It was established earlier that the multistage electrooptic converter invented by Prof. M. M. Butslov has a limiting brightness amplification coefficient which allows it to register single photons. Theoretical discussions showed that similar setups can have a resolving time down to 10^{-14} sec and some spark radiation scanning experiments achieved a resolution of 3.10^{-12}. This led to the use of similar devices in electrooptical chronography. This article surveys the principles of operation of electrooptical devices and the results of plasma investigations using electrooptical chronography. The authors cover 1) the methodology of electrooptical chronography, including power feeding and synchronization of multistage electrooptical converters and time scanning of converted images; and 2) physical

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ACC NR: AT6001404

studies of the plasma including processes in spark discharge plasmas (circuit and block diagrams of setups for time scanning, spark channel widening velocity data), use of electrooptical chronography for the study of HF-field interaction with plasma (block diagram of a device for the study of plasma luminosity during magnetoacoustic resonance), and a brief discussion of special features of electrooptical investigation of plasmas. A resonator for the scanning systems was proposed by R. V. Chikin of the Butslov laboratory. Orig. art. has: 11 figures and 1 table.

SUB CODE: 14, 20 / SUBM DATE: none / ORIG REF: 015

Card 2/2

L 3901-66 EWT(m) DIAAP

ACCESSION NR: AT5022321

UR/3157/64/000/118/0041/0052
541.182.2/3:539.165

AUTHOR: Bolotin, V. F.; Nemilov, N. F.

60
B+1

TITLE: Identification and measurement of the activity of long-lived beta-active fragment isotopes included in the composition of the disperse phase of aerosols

19

SOURCE: USSR. Gosudarstvennyy komitet po ispol'zovaniyu atomnoy energii. Doklady, no. 118, 1964. Identifikatsiya i izmereniye aktivnosti dolgozhivushchikh oskolochnykh beta-aktivnykh izotopov, vkhodyashchikh v sostav dispersnoy fazy aerozoley, 41-52

TOPIC TAGS: radiometry, radioisotope, cesium, rhodium, zirconium, niobium, cesium, strontium, ruthenium, praseodymium, yttrium, gamma spectrum, beta spectrum

ABSTRACT: The object of the study was to identify and measure the activity of nine long-lived beta-active gragment isotopes present simultaneously in the air of certain radiochemical plants: cesium-137, strontium-90, yttrium-90, ruthenium-106, rhodium 106, cerium-144, praseodymium-144, zirconium-95, and niobium-95 (all the isotopes except cesium-137 were present in pairs at equilibrium). The radiometric analysis of samples of aerosol particles on a filter involved the use

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L 3901-66

ACCESSION NR: AT5022321

of beta and gamma radiation spectra. A scintillation gamma spectrometer was used for Cs^{137}, Rh^{106}, Zr^{95}, Nb^{95}, and Ce^{144}, which emit an intense gamma radiation. A scintillation beta spectrometer was employed for isotopes which do not emit gamma quanta (Sr^{90}, Ru^{106}) and isotopes having a small yield of gamma radiation per beta decay (Pr^{144}, Y^{90}). The instrument employed is described, and the instrument spectra of the mixtures of isotopes are discussed. The sensitivity of the instrument is 1×10^{-13} C/l when the content of all the isotopes in the mixture is the same. Orig. art. has: 6 figures, 1 table, 8 equations.

ASSOCIATION: none

SUBMITTED: 16Nov64 ENCL: 00 SUB CODE: NP

NO REF SOV: 002 OTHER: 000

Card 2/2

L 2897-66 EWT(m) DIAAP

ACCESSION NR: AT5022115 UR/3163/65/000/001/0001/0011
539.1.078:539.128.4

AUTHORS: Bolotin, V. F.; Chutkin, O. A.

TITLE: Ionizing spectrometer of type 9014-01 for alpha-radiation and its application in the determination of small concentrations of alpha-active isotopes in aerosols

SOURCE: Soyuznyy nauchno-issledovatel'skiy institut priborostroyeniya. Doklady, no. 1, 1965. Ionizatsionnyy spektrometr al'fa-izlucheniya tipa 9014-01 i yego primeneniye dlya izmereniya malykh kontsentratsiy aerozoley al'fa-aktivnykh izotopov, 1-11

TOPIC TAGS: alpha counter, alpha particle detector, alpha particle spectroscopy, aerosol, uranium, plutonium/ 9014 01 ionizing spectrometer

ABSTRACT: The construction of the type 9014-01 ionizing spectrometer for alpha-radiation and its industrial application in the determination of small concentrations of alpha-active isotopes in aerosols are described. Diagrams of the ionizing chamber, preamplifier, and a block diagram for the installation are presented. The spectrometer was tested on artificially prepared aerosols of U^{234} and Pu^{299} of known concentration. The experimental results are shown graphically in Fig. 1 on the Enclosure. It is suggested that the spectrometer should prove useful in the

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ACCESSION NR: AT5022115 3

monitoring of the maximum permissible concentration of alpha-active isotopes in the atmosphere of industrial and population centers. The authors thank A. D. Verevkin for his help in the design of the preamplifier and V. Ye. Vishnyakov for his participation in the experimental measurements. Orig. art. has: 5 graphs and 1 equation.

ASSOCIATION: Soyuzny nauchno-issledovatel'skiy institut priborostroyeniya (Union Research Institute for Scientific Instruments)

SUBMITTED: 18Nov64 ENCL: 01 SUB CODE: NP

NO REF SOV: 000 OTHER: 000

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ACCESSION NR: AT5022115 ENCLOSURE: 01

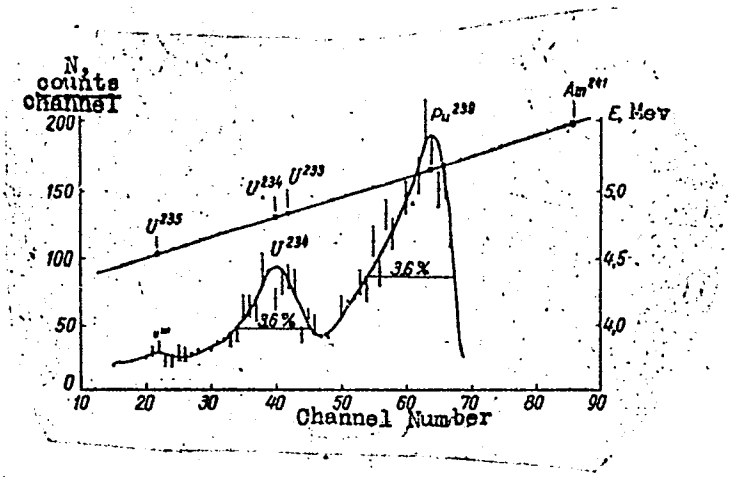

Fig. 1. Spectrum of alpha-radiation of aerosol particles of uranium (.) dots, standard source (0) open circles, and calibration curve of the installation (Δ) triangles

Card 3/3

AUTHOR: Bolotin, V. F.; Ryabov, N. V.; Chutkin, O. A. 27

TITLE: On the problem of compensating natural background beta-radioactivity in measuring small concentrations of artificial beta-radioactive aerosols 16

SOURCE: Ref. zh. Metrol. i izmerit. tekhn., Abs. 1.32.1217

REF SOURCE: Tr. Soyuzn. n.-i. in-ta priborostr., vyp. 2, 1965, 106-113

TOPIC TAGS: radioactive aerosol, radioactivity measurement, beta radiation, alpha radiation

ABSTRACT: An improved method is described for measuring the α-radioactivity of a filter by using an α-spectrometer consisting of a spectrometric α-radiation pickup and a two-channel amplitude analyzer which may be used for isolating the spectral regions for α-radiation of RaC^{I} and ThC^{I}. Pulses from α-particles of all other short-and long-lived isotopes are discriminated. Soft ThB-β-radiation is discriminated by a thin film. Compensation of the daughter products of radon and thoron is separate and independent. The method is based on a constant ratio of the β-radioactivity to the α-radioactivity of the daughter products of radon and thoron. A block diagram is described for an experimental instrument which was used in verification of the method. The experimental results are given. 3 illustrations, 5 tables, bibliography of 7 titles. N. Zevina. [Translation of abstract]

SUB CODE: 18

Card 1/1 bab UDC: 389:539.16.08

BOLOTIN, V.I., inzhener.

Railroad signs made of reinforced concrete on a wooden core.
Zhel.dor.transp. 37 no.10:80 O '55. (MLRA 9:1)

1.Nachal'nik distantsii puti.
(Signs and signboards)

BOLOTIN, V.I.

Serious shortcimings in clarifying the advanced experience of railroad workers. ("Work experience of the Promyshlennaya Railroad Section employees." A.P. Tiazhkun, N.S. Pavliuk, E.P. Kosogorova. "Advance experience in major track repair." "Advanced methods of track maintenance (Collection of articles edited by Engineer A.N. Naumov). Reviewed by V.I. Bolotin.) Zhel.dor.transp. 37 no.6: 92-94 Je '56. (MLRA 9:8)

1. Nachal'nik Moskovsko-Butyrskoy distantsii puti Severnoy dorogi. (Railroads--Management)(Railroads--Maintenance and repair) (Tiazhkun, A.P.) (Pavliuk, N.S.) (Kosogorova, E.P.)

BOLOTIN, V.I., inzhener.

Removal of water from station areas. Put' i put. khoz. no.5:13-15 (MLRA 10:6)
My '57.

1. Nachal'nik Moskva-Butyrskoy distantsii puti Severnoy dorogi.
(Railroads--Stations)

BOLOTIN, V.I., inzh.

Good crossings are a guarantee of safety. Put' i put. khoz. no. 3:17-18 Mr '58. (MIRA 11:4)

1. Nachal'nik distantsii Moskva-Butyrskaya, Severnoy dorogi.
(Railroads--Crossings)

BOLOTIN, V.I., inzh.

Book about track creep ("Creep of railroad track and methods for combatting it" by V.G.Al'brekht. Reviewed by V.I.Bolotin). Put' i put.khoz. no.12:40 D '58. (MIRA 12:1)
(Railroads--Track) (Al'brekht, V.G.)

BOLOTIN, V.I., inzh.

Water is a dangerous enemy of the track. Puti i put. khoz. no.4:22 Ap '59. (MIRA 13:3)

1.Nachal'nik distantsii, stantsiya Moskva-Butyrskaya.
(Railroads--Maintenance and repair)
(Drainage)

BOLOTIN, V.I., inzh.

Simple calculation of switch curves. Put' i put.khoz. no.10:44-45 O '59. (MIRA 13:2)

1. Nachal'nik distantsii puti, stantsiya Moskva-Savelovskaya.
(Railroads--Switches)

BOLOTIN, V.I., inzh.

Effect of surface water diversion on the stability of the rail support. Vest.TSNII MPS 19 no.1:24-27 '60. (MIRA 13:4)
(Drainage) (Railroads--Track)

BOLOTIN, V.I., inzh.

Mechanization of earthwork. Put'i put.khoz. 4 no.7:34 Jl '60.
(MIRA 13:7)

1. Nachal'nik distantsii, stantsiya Moskva-Savelovskaya.
(Railroads--Earthwork)